U.S. Department of Health and Human Services
NIH News
National Institutes of Health

National Cancer Institute
http://www.cancer.gov

FOR IMMEDIATE RELEASE
December 8, 2004

Contact:
NCI Press Office
(301)496-6641

National Cancer Institute Announces Awards to Accelerate Cancer Biomarker Discovery

The National Cancer Institute (NCI), part of the National Institutes of Health, announced that SAIC-Frederick, Inc.∗ has made two-year awards under a competitive solicitation totaling $13.4 million to two research teams from 10 cancer research institutions. The awards reflect a new collaborative team approach to develop the standard tools and resources needed to accelerate protein biomarker discovery to provide new and highly specific approaches to the early detection and diagnosis of cancer.

The teams of researchers will use transgenic (genetically defined) mouse models of human cancers to study current proteomic technologies, compare results, and provide reference data sets and biological resources for widespread research use throughout the cancer research community. This approach will enable comparability of results among multiple laboratories currently using different proteomic technologies. In addition, the common data sets and resources will make it easier to develop and test the next generation of technologies for biomarker discovery. This framework will provide direction for the development of specific strategies to target biomarkers that signal the earliest stages of cancer in humans.

When completed, this two-year effort will result in the first reliable and broad-based technological platform for the discovery and clinical validation of protein biomarkers for cancer. Data and information will be closely integrated and distributed through the cancer Biomedical Informatics Grid (caBIG), an open-source, open-access, information network linking teams of cancer and biomedical researchers.

∗ SAIC (Science Applications International Corporation)-Frederick is the operations and technical support contractor for the NCI in Frederick, Md., operating the NCI-Frederick campus.

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"Proteomics holds enormous potential for the early detection of cancer, but researchers must have standard reagents and reproducible technologies to accelerate the discovery and development of these biomarkers into clinical use," said Andrew von Eschenbach, M.D., director of the National Cancer Institute. "We believe that this unique network -- with its teams of experts -- will speed up the development of effective proteomic technologies for the benefit of cancer patients and their families."

Proteomics is the large-scale study of protein function and expression. When cells become cancerous, they can release unique proteins and other molecules into the blood and other bodily fluids. These molecules may serve as early biomarkers, or indicators of cancer. Identifying protein biomarkers is extremely difficult, however, due to the large number of proteins in the body and the fact that their structures are frequently modified in response to environmental and other stresses in cells. While current and future technologies are expected to be sufficiently robust to discover these proteins, researchers will need well-characterized and standardized materials and resources to validate and compare results across different laboratories.

"To be effective in cancer research, discovery and development, we need to establish a strong basis of comparability of data – especially in proteomics," said NCI Deputy Director Anna D. Barker, Ph.D. "These awards reflect NCI's commitment to creating the cross-disciplinary, cross-institutional partnerships that will be the hallmark of the research enterprise in the 21st century, both to advance our knowledge of cancer and to translate it with a sense of urgency into new interventions that will reduce suffering and save lives."

These teams of researchers will develop a range of important resources by:

- Evaluating proteomic techniques for tissue collection, sample preparation and measurement
- Developing more effective proteomic technologies for detecting and identifying proteins and protein fragments in serum
- Creating resources, such as serum and plasma specimen repositories, antibodies and peptide reagents, to serve as common community resources
- Establishing a publicly available database, including bioinformatics support, for analyzing proteomics data

The mouse models of human cancers are well-documented resources for cancer researchers to test the effectiveness of a wide range of proteomics technologies to support the discovery of biomarkers for cancer. Researchers from all sectors will be able to use the resources developed

in this program to validate their methods and meaningfully compare mouse and human proteome data to discover new cancer biomarkers.

The proteomics awards announced today are part of NCI's ongoing efforts to provide scientists with the resources necessary to optimize and accelerate the development of advanced cancer technologies. Other related and complementary efforts are in the fields of nanotechnology through the NCI Alliance for Nanotechnology in Cancer (http://nano.cancer.gov), and in bioinformatics through the cancer Biomedical Informatics Grid (http://cabig.nci.nih.gov/).

One of the proteomics research teams is headed by Samir Hanash, M.D., Ph.D., of the University of Michigan. Other members of the team include:

- Gilbert Omenn, M.D., Ph.D., and David States, M.D., Ph.D., of the University of Michigan
- Raju Kucherlapati, Ph.D., and David Sarracino, Ph.D., of the Harvard Partners Center for Genetics and Genomics
- Tyler Jacks, Ph.D., and Alice Shaw, M.D., Ph.D., of the Massachusetts Institute of Technology
- Ronald DePinho, M.D., and Nabeel Bardeesy, Ph.D., of the Dana Farber Cancer Institute
- Brian Haab, Ph.D., of the Van Andel Research Institute
- Harold Varmus, M.D., of the Memorial Sloan-Kettering Cancer Center.

Martin McIntosh, Ph.D., and Amanda Paulovich, M.D., Ph.D., of the Fred Hutchinson Cancer Research Center are leading the other proteomics research team, whose members include:

- Christopher Kemp, Ph.D., of the Fred Hutchinson Cancer Research Center
- Ruedi Aebersold, Ph.D., of the Institute for Systems Biology
- Richard Smith, Ph.D., of the Pacific Northwest National Laboratory
- N. Leigh Anderson, Ph.D., of the Plasma Proteome Institute.

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For more information about cancer, visit the NCI Web site at http://www.cancer.gov or call NCI's Cancer Information Service at 1-800-4-CANCER (1-800-422-6237).